REVIEW OF THE

TELEGRAPH AND TELEPHONE

A JOURNAL OF ELECTRICAL, SCIENTIFIC AND MECHANICAL NEWS.

Vol. 1, No. 13, NEW YORK, AUGUST 15, 1882. $2.00 Per Annum. Single Copies, 10 Cents.

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Entered at Post Office, New York, as Mail Matter of the Second Class.

Resolve.

Build on Resolve, and not upon regret
The structure of thy future Do not grope
Among the shadows of old sins, but let
Thine own soul's light shine on the path of hope
And dissipate the darkness. Waste no tears
Upon the blotted records of lost years,
But turn the leaf, and smile, oh! smile to see
The fair white pages that remain for thee.

Prate not of thy repentance. But believe
The spark divine dwells in thee; let it grow.
That which the upreaching spirit can achieve
The grand and all creative forces know.
They will assist and strengthen, as the light
Lifts up the acorn to the oak tree's height.
Thou hast but to resolve, and lo! God's whole
Great universe shall fortify thy soul.

—*Ella Wheeler.*

National Telephone Convention.

Let no telephone exchange man forget that on Tuesday, September 5th, will be held, at Boston, the fourth meeting of "The National Telephone Exchange Association."

It is to be hoped that this will be the largest assemblage of telephonists ever gathered together.

The standing committees appointed are as follows:

1. Legislation—J. B. Speed, Louisville; M. F. Tyler, New Haven; A. B. Uline, Albany.

2. Central Office System and Apparatus and Exchange Statistics—C. N. Fay, Chicago; H. B. Lytle, Boston; W. S. Reyburn, Peoria.

3. Line Construction and Maintenance—C. W. Ross, Columbus; L. B. Firman, Chicago; J. C. Reilly, Philadelphia.

4. Cables and Subterranean Systems—H. W. Pope, New York; Thomas D. Lockwood, Boston; George L. Wiley, New York.

5. Call Bells—F. O. Vaille, Denver; Henry Metzger, Pittsburgh; H W. Spang, Reading, Pa.

6. Telephone Supplies—W. H. Jackson, Detroit; J. S. Ross, Nashville; H. N. Gifford, Louisville.

7. Electrical Disturbances—W. H. Sargent, Philadelphia; C. E. Chinnock, New York; C. H. Haskins Milwaukee.

8. Exchange Rates—George F. Durant, St. Louis; E. J. Hall, Buffalo; J. P. McKinstry, Cleveland; Samuel Ivers, New Bedford; Frank A. Newell, Bradford, Pa.

Some of the gentlemen composing these committees have left the country, others are not engaged in telephony, and some have changed their sphere of action from one city to another, but we have no doubt that a sufficient number will be present to make the meeting instructive as well as entertaining.

Western Union and Mutual Union.

A despatch from Dayton, O., says that the Mutual Union Telegraph Co had petitioned the courts to compel the Western Union Telegraph Co to receive from the Mutual messages to points on Western Union lines which were not reached by the Mutual Union system. An officer of the Western Union said yesterday that the Western Union had received and would continue to receive for transmission at Dayton, or any other point, messages from other companies, provided that the message did not originate at the point at which it was given to the Western Union by another company. He said that when a message is written under the message heading of another company, and then sent to the Western Union, and rewritten or pasted on a Western Union blank, to be forwarded the entire distance by that company, it makes the sender appear to have signed the Western Union blank, although he has not done so. For that reason he said, the Western Union had refused to receive messages under those conditions.

Electricity as Light and Motor.

Invitations have been issued by the mamagement of the Manufacturers and Mechanics' Institute Exhibition of Boston, to all the Electric Lighting companies in the United States, and agencies of those abroad, to make a display of their systems of lighting, both arc and incandescent, at the next exhibition, and without doubt a very large display will be made. If this should be successful, there will be a display of electric lighting there that will interest all manufacturers that are looking towards the inevitable. A number of steam engines will be furnished, and some high speed motors, with an especial view of furnishing power for the dynamo machines for electric lighting. This is expected to be one of the most interesting exhibits in the whole display, and one of the most instructive as well. The uses to which electricity has been applied are becoming more and more numerous; and it is not improbable that heating by electricity will also be exhibited at at the same time and place as the lights. "We have ourselves," says a Boston paper, "eaten beefsteak and eggs cooked by electricity, which few men can say. Material for doing it is here; and as we write this, a heater with 600 inches of radiating surface is hot in our press-room. This will be something novel to those who never expected to cook their steak, eggs, bacon and coffee by electricity, while the same current, after having done its work in furnishing food, had gone further on its way, and was giving light for any purpose, either mechanical or industrial.

Wire Fences and Telephones.

Some observing genius has suggested that the loneliness of home life on the Western praries, where farmhouses are often miles apart, may be alleviated by a general utilizing of fence wires for telephonic communication. As in some sections of the country all the fences are of wire, most of the "plant" for several private telephones is already in possession of every farmer, so only terminal fixtures are necessary to a free interchange of gossip between families that are too far apart for family calls in bad weather. The plan certainly has attractive features. If it were adopted the farmer's wife, when so tired of the monotony of home life that she can get no comfort indoors except by slapping the children and pecking at her husband, can drop into a rocking-chair near the telephone and chat as cheerily with a distant neighbour as if she had never had a trouble in her life. Then she could give her husband a chance and let him swap horses and exchange crop prospects with the "boys" at the nearest village store. Aside from its convenience such a telephone would be a great educator, for when in use by the gentler sex it would do what society rules have always been unequal to—it would compel women to talk one at a time.—*Ex.*

The Bichromate Battery.

An arrangement of the bichromate of potash battery has been introduced by Mr. F. Higgins, of London The cell consists of an earthenware jar fitted with an overflow spout near the mouth, and on the bottom is placed scrap zinc in a pool of mercury. A copper wire insulated with gutta-percha, except at the foot, where it enters the amalgam of zinc and mercury, passes down the middle of the jar. Two carbon plates arranged parallel to each other are suspended from the mouth of the cell by a frame and connected by an electrode. The battery of these cells is built up by placing each one a little below the one before it on a step, platform or stair, so that the overflow liquor of one cell may run into the next, and thus a continual circulation of waste liquor may be going on from the high reservoir to the low one. The circulation prevents polarization of the plates and produces a powerful and steady current. The electro-motive force of each cell is from 1.9 to volts, and its internal resistance is a mere fraction of an ohm.

Bordeaux Exposition, France.

The Edison light will be used in the theater of the Bordeaux Exposition, also in the orchestra, the garden and the aquarium, requiring an installation of about 200 lamps.

Progress in the First District, New York City.

The street-mains are now all laid and the entire network of underground conductors finished, aggregating over 80,000 feet, including mains on the block fronts, street intersections, bridge intersections and feeders. House connections between the street-mains and the wires in the houses are being rapidly made, meters are to be put in, and many of the larger consumers of light are either adapting their gas fixtures to the electric light, or are putting in new fixtures especially designed for the lamps. The Board of Underwriters allow the company to at once introduce their conductors into buildings under the limitations set forth in the following circular :

NEW YORK BOARD OF FIRE UNDERWRITERS,
COMMITTEE ON POLICE AND ORIGIN OF FIRES,
BOREEL BUILDING,
No. 115 BROADWAY,
NEW YORK, July 6, 1882.

THE EDISON ELECTRIC ILLUMINATING CO. OF NEW YORK :

GENTLEMEN,—In accordance with your request for a letter which you can show to your customers, we beg to say, that the introduction of the Edison conductors from the street mains into the buildings will not of itself affect the insurance on such buildings, provided that the exposed ends of the wires or rods are covered with insulated tape and separated from each other by pasteboard, and a metal cap is screwed on the extreme end of pipe, and also provided that no connection is made between the service pipe and the house wiring.

Before such connection is made, however, and the Edison light is used in any building, the wiring and arrangements in such building must be examined by the authorized inspector of this board, and a certificate of conformity given.—Respectfully yours,

WM. A. ANDERSON,
Chairman of Committee.

Responsibility of Telegraph Companies.

Another judicial decision has just been promulgated, which railway, telegraph and other corporations will do well to ponder over. It is to the effect that the so-called stipulations printed on the "blanks" possess no legal validity. In other words, the common-sense view that "it takes two to make a bargain" is again recognized as good law as well. One of the "blanks" in question declared that a certain American telegraph company "would not be responsible for mistakes unless the message be repeated, and this point has been considered by the United States Court at Leavenworth, Kansas. 'We can only say,' remarked the court, 'that any rule or regulation of the company which relieves it from performing its duty, belonging to the employment, with integrity, skill and diligence, contravenes public policy as well as the law; and under it the party at fault cannot seek refuge. If it becomes necessary for the company, in transmitting messages with integrity, skill and diligence, to secure accuracy, to have said messages repeated, then the law devolves upon them that duty.'"

Candle Power of Electric Lamps.

It would be well to remember in the future that the 2,000 candle power Brush lamp, as employed in the city lighting, is stated to give that amount of light when *naked*, but as covered with a globe this light is reduced 50 per cent., or to 1,000 candles. The Weston lamp, for the same purpose, is stated to give 1,600 candle power naked, and about 1,000 when inclosed, the globe only reducing the light from 30 to 40 per cent. The smaller Siemens lamps, which were stated to give 300 candle power each, must be understood to mean when inclosed in their globes.—*Exchange.*

Value of Telegraph Property and Stability of Business.

VALUE OF THE PROPERTY.

"It is no uncommon thing to hear urged against telegraph property, as an investment, that it is of an exceedingly fragile character—that it is diffused over such broad areas as to be unavailable for realization, and that once having been built it would be impossible, if the business fails to grow up, to escape total loss. This is exceedingly true, so far as competing telegraphs are concerned; but it does not apply to a company occupying, to a very large extent, exclusively the territory covered by its wires, and possessing an earning power such as the Western Union has demonstrated by its years of dividends earned and paid. While it may be true that telegraphic plant is fragile, widely scattered, intangible, and enough out of sight to lack that solidity which makes other investments attractive, it may with equal truth be urged that it is not exposed to the multitude of dangers besetting all other investments. Floods may sweep away miles of railway, riot may cause tracks to be torn up, station houses, locomotives and loaded cars to be burned; rows of houses may be leveled by fire in a night; a mortgage may be rendered valueless by the death of the promiser; indeed, it is hardly possible to conceive any investment not exposed to mutations of one kind or another, The Western Union Company, owing to the wide area over which it is distributed, is less liable to permanent injury than any other property. Should a tornado occur in one State in the South, destroying lines and interrupting communication, it does not interfere with the earning power of the lines in other States in the north or west. Floods, fires, failure of the crops in one locality, do not affect the ability to earn in another. The telegraph cannot be blown up in a night, or affected seriously by any combination possible, except such cataclysms as ruin the prosperity of the entire country. It is the only enterprise that is omnipresent and universal in its earning power, taxing every "boom," whether in New England or New Mexico, and but slightly affected if at all, by the misfortunes of either locality, which are fatal to local enterprises. The worst damage possible in one city that can happen to a telegraph line, even its total destruction, can be immediately repaired at a slight cost; while its circuits are so numerous that hardly any combination of evils could affect the current through business, this being carried on independently of any local disturbance. Therefore, though telegraph property may appear to be fragile, widely scattered, and, in a sense, unrealizable, it possesses an elastic element, rendering it less liable to serious damage of a permanent character than any other kind of plant."

STABILITY OF BUSINESS.

"The prosperity of the Western Union Telegraph Company is less affected than that of any other investment property by adverse circumstances which may affect the country generally. It is true that in times of the highest prosperity the telegraph is called into frequent requisition, but it is equally true that when panics and disasters impend there is a still greater necessity for this rapid means of communication. No property in which investors generally can purchase shares has a greater elasticity in its income than this. Of necessity the telegraph, as the second means of communication, adapts itself to the wants of the entire community, and what to almost every other business would be disaster and loss, may be contributory of profit and prosperity to the telegraph company; so that in choosing an investment it would be difficult to find one so universal in its extent, and at the same time based upon one of the essentials of existence, in a country whose distances are so magnificent, and to the progress of which quick communication is of such vital importance.

"But it is not only in times of prosperity or adversity that instantaneous communication is a vital element but every day's progress makes the field larger, and the use of the electric current more general. Custom, habit, convenience, luxury, necessity, all combine to create a rapid growth of this business. Thus, congratulations upon a wedding are much more frequent by telegraph now than they used to be by mail; sympathy at the death of a friend, rejoicing at the birth of an heir, are all events that contribute their quota to the coffers of the telegraph company, equally with the news of the assassination of a President, notwithstanding the wide contrast between the importance of the events. Laziness contributes in no small degree to the revenue; for the man who would shrink from writing three or four letters a day, thinks nothing of dashing off a dozen ten-word messages; in fact, is rather pleased than otherwise to be able to accomplish so much with such a trifling effort. It is difficult to name an interest, an event, a vice, or a virtue which does not avail itself of the electric fluid as a means of communication. Ministers exchange pulpits by telegraph, and are summoned to christenings, weddings, and death-beds; appointments are made with the dressmaker, the dentist, the tailor, and the chiropodist; fleets are moved; trains are dispatched ten thousand in a day; the furthest ends of the earth are reached and the most stupendous events recorded through the medium of this company's operations. The first thing that the entire community does in the morning is to glance at the news which the telegraph has brought, and on which the Western Union Company makes a handsome profit. However much the use of the telegraph may have permeated all ranks, walks, and conditions of life in Europe or elsewhere, it is ten times the case in America, where the spirit of enterprise, the eager race for wealth and the growth of prosperity, make expenditures in this direction lavish, when compared with that prevailing in any other portion of the world. In all this the Western Union participates almost exclusively, and its share-holders profit thereby."

Electrical Storage.

SOME POINTS IN M. FAURE'S INVENTION NOT HITHERTO EXPLAINED.

It is a very curious fact, and one that illustrates the mystery in which many of the simpler problems of electrical engineering are still wrapped, that when the manufacture of a storage battery by M. Camille Alphonse Faure, by means of which the objections to electrical storage were overcome, was first announced in this country, scarcely an electrician could be found who could accurately explain the principle upon which the accumulation of energy in secondary or polarization piles is founded. Indeed, although many descriptions of M. Faure's invention have been published since the successful use of his piles for lighting the steamship Labrador during an ocean voyage attracted general attention to their merits, there are very few electricians in the United States at the present moment, probably, who could furnish in a public lecture an exact exposition of the *rationale* of their operation. It is known in a vague way that the principle of the storage battery was discovered by M. Gaston Planté, of Paris, some years ago, and explained in a paper read before the Academy of Sciences. Extraordinary predictions relative to its future were indulged in by M. Planté and his admirers. But there were practical difficulties that rendered his battery too expensive for general use. In its simplest form the battery of M. Planté was composed of two leaden plates immersed in some electrolytic fluid, a 10 per centum solution of sulphuric acid in water being the electrolyte usually employed, although other acid and alkaline solutions

were available. The capacity of the plates to accumulate and store electrical energy depended upon rendering their surfaces more or less porous by means of successive charges and discharges of the current; and this process, which was styled the formation of the plates, rendered them in practice very expensive things, though the lead of which they were composed was of insignificant cost. Moreover, the absorption was limited, not only by the thickness of the plates themselves, but by the cohesive attraction of the porous layers, thus formed, which invariably scaled off or crumbled in pieces before the lead had been decomposed to an adequate depth. This fact rendered the active layers of the plates so thin that the battery, though embodying a brilliant discovery in physics, was practically a very feeble and inefficient affair. It is very singular that a mode of obviating these objections did not occur to the ingenious mind of M. Planté. But such was not the case, and the invention lay inert and useless until M. Faure took hold of it and introduced some practical improvements.

All the latter actually did was to substitute for the porous layers that M. Planté produced by the tedious process of successive charges and discharges of electricity layers compounded artificially by mixing oxides of lead with suitable cohesive materials so as to form a paste or paint, and applying the latter to the plates. In this manner an active layer of sufficient depth and coherence was obtained. The materials, in addition to the metallic oxides used in the manufacture of the paste or cement, consisted preferably of sawdust or crushed coke, which rendered the compound exceedingly porous and permeable by the solution of sulphuric acid. When applied to the plates the layers are held in position in M. Faure's battery by wrapping each electrode thus formed in felt, cotton cloth, or other porous material not liable to be decomposed by the solution; or when the plates are placed in the box the space between them can be filled with any porous material to hold them in position. Rivets or cements may be used to bind the active layers to the lead plates in constructing the piles; but in practice M. Faure has found that a wrapping of felt or cotton cloth answers as well, and such was the mode employed in the construction of the batteries on board the Labrador, which endured the jar and accidents of the voyage without a single untoward accident. The cost of a cell as thus constructed is practically an insignificant item—the plates and oxides, sawdust or coke, cotton cloth, and materials for boxing being obtainable in quantity at a trifling cost, and being absolutely (exclusive of the acid solution) the only requisites for the manufacture of the cells. No especial skill is required in putting the materials together, and none in operating the piles.

The simplest form of M. Faure's battery is that in which two plates—one positive and the other negative—constitute a cell of sufficient energy for medical purposes; and such cells, charged for immediate use, are now, according to the latest advices, in considerable demand among physicians in Paris. But the cell most popular with medical men, owing to the smaller space occupied by it, is of cylindrical pattern and constructed with considerable ingenuity. One of the plates is bent into the form of a hollow cylinder which fits easily into a cylindrical box, and is then coated with a porous material to any depth required. For the other plate a thick rod of lead is substituted, and upon this novel form of electrode the layer is laid externally to the depth corresponding with that of the paste with which the cylinder is coated. The thick rod slides easily within the cylinder, leaving ample space for the interposition of the porous non-concucting metal—felt, cotton cloth, asbestos cloth, or whatever it may be—which is employed to separate them from each other and prevent contact. A very compact cell is thus constructed—one not liable to get out of order and occupying far less space, energy for energy, than those that were used on the Labrador for lighting purposes. The cost of manufacture is, however, a trifle more than that of the form of cell devised by M. Planté and copied by M. Faure.

For lighting purposes large cells are formed by using any number of plates from 10 to 20, the connections being made alternately so that one-half of the number are joined together as a positive electrode and the other half as a negative one. Thus, under the Faure invention as in use by the Société Anonyme de la Force et la Lumiéré, of Brussels, Belgium, three styles of the secondary battery are manufactured. The patent was issued in France, Oct 20, 1880, and in January, 1882, M. Faure was granted letters patent by the United States Patent Office.

The principle upon which the secondary battery is founded has not hitherto been explained in popular terms, and is understood probably by very few electricians. It is this: When a cell constructed in the manner just elucidated is included in the circuit of an electrical generator or other source of energy, the lead oxide of one of the layers or sets of layers affixed to the plates is slowly reduced to the metallic form of a porous mass, while that of the other set is transformed into a peroxide of lead. When this process is finished, the battery is charged and prepared for use. So long, however, as the two electrodes are not connected, no alteration takes place, the reduced lead of the one layer or set of layers remains permanent, and the peroxide of the other remains peroxide. In this condition the cell may be stored for weeks, or even for months, and there is no escape or other manifestation of the stored energy. The plates forming the positive section of the cell are all in equilibrium with each other, and those of the negative section equally so. The result is quiet; equilibrium is always permanent, so long as no disturbing element is interposed. But the moment the two sets are connected, and a circuit is formed, the equilibrium is disturbed. The result is an electrical discharge, which continues until the oxide, reduced by charging, is transformed into oxide again, and peroxide into reduced metal, when, the equilibrium being restored, the evolution of energy ceases. The discharge is regular and continuous, occupying some days in the larger cells, unless interrupted by breaking the circuit, when it ceases abruptly, to be renewed at the will of the operator. When the discharge is finished by the restoration of equilibrium, the cell may be recharged as before by including it within the circuit of an original source of energy. The process of oxidizing the metal of one electrode, and of peroxidizing that of the other, is now repeated, and when complete through the whole depth of the several porous layers, the battery is charged.

Mr. John Holland's discovery of a method of fusing iridium is working wonders. An exchange reports that the metal has been applied to use for jewels in watches at Waltham, Mass., and at Elgin, Ill., with wonderful success, but we are inclined to regard this statement as an error. Iridium is not an elegant-looking article by any means, and is, also, far more expensive than jewels. It will therefore scarcely take their place, however valuable it may become to the jeweler. It is not magnetic, and for that reason forms an excellent proof for the magnetic needle. It is practically infusible, and therefore is qualified to perform an important function in the construction of telegraphic apparatus. In hardness it is next to the diamond, and is used for teeth for saws made for cutting marble. Jewelers are using it for ornaments, and the high polish which it takes adapts it admirably for that purpose. When polished in the form of a disc it resembles the finest jet. In the most delicate scales for weighing, on points to drawing pens and in a multitude of other ways it has already become in request, and the demand for it is fully up to the capacity of the Cincinnati manufactory.

A Super-Sensitive Thermometer.

Since the days when Mr. Edison brought out his micro-tasimeter, which proved so sensitive to heat, until now, we have had no instrument devised for measuring extremely delicate changes of temperature. Such an apparatus has, however, been recently devised by M. Michelson, and brought, at least in its experimental form, before the French Physical Society. It is based on the principle of bi-metallic thermometers, but ebonite or hard caoutchouc is chosen instead of one metal. Hard rubber is ten times more dilatable than platinum under heat, and a spring, composed of platinum on one side and ebonite on the other, will curve under the least increase of temperature. At the extremity of the spring is fixed a small glass stem, forming an elbowed lever, which abuts against a light mirror, suspended by a silk fiber. When the spring curves or straightens, the mirror is deflected, and a ray of light from a lamp reflected from its surface to a scale moves up or down the divisions of the scale. By giving to the spring and lever a relatively great length, this instrument can be made very sensitive, and the inventor hopes to be able to measure the thousandth of a degree Centigrade.

The Telephone on the Battle-field.

The methods used by the English journals to keep their readers in immediate communication with the bombardment of Alexandria seem to have been perfect of their kind. At Malta, 1,000 miles distant—though words were inaudible through the telephone—the thunder of the pieces was distinctly heard. By the further help of scientific methods adapted to newspaper correspondence we may in time expect many marvelous things to be presented in the columns of enterprising journalism. Thus, seated at his desk in New York City, the telephonic editor may write—descriptive of some future Franco-German battle-field: "The sharp ping of the rifle ball is now being heard, and the booming of the artillery, while the rattle of sabres and the clatterings from thousands of horses' feet presupposes that a cavalry charge is taking place. Now the sad moanings of the wounded are becoming most distressing, and cries for 'water' are constant. The infantry are possibly getting the better of it, as the cheers of victory are now quite distinct. Bursts of military music can now be heard, mingled with the cheers of the men. From the wide diffusion of the sound it is quite positive that a very heavy engagement is now going on, over an extended area. A very loud explosion just here has interrupted the working of the telephone—probably a shell which has burst in its immediate proximity." For the proper interpretation of such telephonic communication, of course, no ordinary newspaper man would do. A military training would be a necessity; so, in some years to come, when all these new methods of imparting news are brought to their highest degree of excellence, retired officers who have been to the wars will find themselves in service again in a newspaper capacity.

The Northern Pacific Railroad track is now laid in the Yellowstone Valley a distance of 211 miles west of Glendive. This is within fifteen miles of the important town of Billings, in the heart of Montana. The track is said to be going down at the rate of one and a half to two miles per day.

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(AN ELECTRICAL JOURNAL.)

PUBLISHED SEMI-MONTHLY AT 23 PARK ROW.

P. O. BOX, 3329.

GEORGE WORTHINGTON, - Editor and Proprietor.

SUBSCRIPTION.

United States and Canada, $2 00 per annum, in advance.

Great Britain and other foreign countries, $2.50 = 10s. = 13 francs. Postage free.

ADVERTISING.

Transient rate, 35c. per line each insertion.

"Business specials," 50c. a line.

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The Editor does not hold himself responsible for opinions expressed by his correspondents.

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NEW YORK, AUGUST 15, 1882.

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The Gramme Combination.

The Gramme Electrical Company, whose organization is now complete, represent nearly the whole Electric Light interests of the country, the shareholders are the seven large companies which are at present doing business in this country and Europe. This combination is organized solely to protect the rights and interests of the companies from being infringed by irresponsible parties, and it may be said in protecting them it also protects the public against worthless speculative organizations. Its effectiveness in this respect is assured, as they represent substantially nearly all the controlling patents pertaining to Electric Light system, and for purposes of litigation could not well be stronger.

The officers, shareholders, trustees and advisory board are as follows:

President, Col. Rowland R. Hazard; Vice-President, Henry I. Hoyt; Treasurer, Robert W. Blackwell.

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We are in receipt of a very neatly bound and handy style of subscriber's list of Providence Telephone Company from our friend Duxbury, and notice the steady increase of the immense telephone business now under control of that company. Providence has we find from this record nearly 1,500 subscribers and the other towns under their control some 900. The management of this company has been of the first order throughout and its service is never complained of. The Providence Exchange is a model one and has almost a national reputation as such.

We have extracted the following from the columns of the *Scientific American:*

Telephone Sounds.

The *Operator* says: "Mr. Nat. G. Warth, manager of the Midland Telephone Company, Gallipolis, O., writes: 'Please give some one the chance of explaining this phenomenon. This morning early, while in temporary communication over a Western Union wire with Major R. B. Hoover, at Pomeroy, Ohio, twenty miles away, I could distinctly hear the croaking of frogs and the singing of birds. The wire passes through dense woods and along large streams between the two points. There were only the two sets of instruments in circuit. The sounds certainly were taken up and transmitted from some point between us. Now, by what law could this occur? Could the sound have been induced by a damp atmosphere?'"

For want of a better explanation, we put forward our own ideas.

Every telegraph line, and every telephone line too for that matter, has necessarily a certain number of joints in it: every one of these joints is, unless soldered, a microphone of more or less power; the more perfect the joint, the less perfect the microphone, and *vice versa*. A microphone is nothing more or less than two or more conductors connected together electrically by an imperfect joint. The Blake transmitter is a good example of this. In it, the point of contact between the button of carbon and the point of platinum is the imperfect joint, which when varied ever so slightly, correspondingly varies the resistance of the circuit, thus producing changes in the strength of the current; these changes in turn causing variations of the magnetic power of the telephone magnet, which of course are made manifest to the listener by noises in the telephone identical in character with those originally inducing the varying resistance of the bad joint.

A battery current on the line is however necessarry to vitalize the imperfect connection, and enable it to act microphonically.

Our explanation then, from the foregoing premises, is this:

The line in question had at some point near the locality where the frogs were croaking and the birds were singing in the morning an imperfect joint, which was affected by the noises of the vicinity, and its resistance accordingly varied. Being a Western Union wire, it is possible that a battery was at the time in circuit though unmentioned by the enquirer.

But if such was not the case, it is unquestionable that sufficient current would constantly leak from other and parallel telegraph wires to charge the wire which was being used at that time for telephonic communication.

This effect might be aided, and probaby was, by the damp atmosphere referred to.

Dry Goods Store to be Lighted with Edison Lamps.

Messrs. Aitken, Son & Co., corner Broadway and Eighteenth street, New York City, have ordered a Z dynamo, with 36 A lamps and 36 B lamps, to light their store.

Familiar Talks About Electricity and Magnetism.

No. 3.

Robert Symmer, an English philosopher, took up the speculations of Dufay, regarding the nature of electricity in 1759, at the point where the latter had laid them down, but somewhat modified them; instead of maintaining that the two fluids were independent of each other, as supposed by Dufay, he held that they were co-existent, and that by counteracting each other, they produced all the phenomena of electricity.

His idea reduced to a few simple words, was that when any body is said to be positively electrified, it is possessed of a larger share of the positive fluid, than of the negative and *vice versa*.

The second theory, generally called the "single fluid theory," was first announced by Sir William Watson in England; but was independently imagined, and fully elaborated by Benjamin Franklin, in the same year, 1847.

This supposes the existence of a single elementary homogeneous fluid of extreme tenuity and elasticity, without weight, existing as evenly distributed throughout all matter, as nitrogen is in the atmosphere. It is assumed to be repulsive of its own particles, but attractive of all other matter.

In its natural or unexcited condition, it was supposed to be distributed in all bodies, in quantities proportionate to their capacity or attraction for it; and in this case there is a sort of equilibrium of distribution, with electrical repose as a result.

When the quantity of this supposed fluid in any substance is increased or diminished, the equilibrium is disturbed, and the body strives to regain its full amount if its quantity has been diminished, and to throw off the surplus if its quantity has been increased.

According to this theory, electrical manifestations are the results of these efforts for the restoration of the proper amount, neither more nor less, of the supposed fluid.

This theory has from its celebrated founder been called the "Franklinian hypothesis," and in it the terms "Positive" and "Negative," or "Plus and Minus" originated; representing the two opposite states. Any substance according to the terms of the theory, having more than its amount of electricity being said to be charged with positive or plus electricity, while any body having less than its proper amount was said to be negatively electrified.

Other theories have from time to time been promulgated, but they have not been generally, even, so satisfactory as the foregoing.

Nearly all philosophers, physicists and electricians have now, however, discarded the fluid theory, whether single or dual; yet the terms and definitions under the fluid *régime* have been retained; because, firstly, they enable us to describe intelligently the electrical properties of matter; secondly, because no first-class substitutes have been offered in their place; and, thirdly, because we can never altogether overcome the results of early training; and so while we do not think electricity is a fluid or a compound, made like the Briton's favorite beverage "arf and arf," of two fluids, we keep on, and probably will continue so to do for a good many years yet, talking about currents and charges and so forth. In short, while thinking of electricity as one thing, we talk of it as another.

There is yet another explanation offered of the phenomena of electricity. It must be confessed that like the fluid theories, it also is hypothetical; but it it appears more likely to be the true explanation, and it is now preferred by most scientists. According to this view, which is due to the researches and discoveries of Faraday, which has only been adopted within the last half century, and which had a very hard childhood lasting until a very few years ago, electricity is supposed by those who should know it best to be a peculiar agent or force of nature, which causes the atoms or particles of matter to alter their positions with respect to each other.

Assuming this explanation to be the correct one, the metallic conductor, which, to use a familiar illustration, may be the telegraph wire which connects the two terminal plates of the battery together, either by a complete metallic circuit or by a compound circuit of wire and earth, is not a road for the passage of a current, but exhibits electrical phenomena throughout its entire length, because its connection with the zinc and copper wetted by the acid of the battery, produces for the time a new arrangement of its particles or molecules, which invests the wire with new properties which we call electrical.

PARIS, August 1, 1882.

GEORGE WORTHINGTON,
Editor of the TELEGRAPHIC REVIEW.

DEAR SIR,—Thinking your electric light readers would be interested to know the exact number of Jablochkoff Electric lamps in actual use in Europe, I forward herewith the list, which may be relied upon for correctness:

In France.

Paris	844
Argenteuil	36
Armentieres	48
Bezons	28
Biarritz	28
Bordeaux	20
Havre	40
Ivry	48
Lille	116
Lyons	60
Marseilles	12
Nantes	28
Pierrepont	32
Reims	24
Toulouse	16
And in 45 other towns of France, a total of	566
Making a total in France	1,946
In Germany	44
Alsace-Lorraine	32
England	206
Austria	6
Belgique	200
Birmania	40
Brazil	16
Canada	4
Cuba	32
Denmark	16
Spain	20
Greece	24
Holland	48
English India	218
Italy	68
Mexico	8
Persia	4
Portugal	4
Argentine Republic	22
Island of the Reunion	8
Sweden	4
Switzerland	14
	1,038

These are all furnished by the Société Française.

Very truly yours,
R. G. BROWN,
Electrician and Superintendent.

The American Institute of Mining Engineers will meet in Denver in August. The fare, which includes sleeping cars both ways, is $113, a deduction of $26 from the ordinary rates. It will be understood that these figures refer to a return between Denver and New York.

We are informed that a new Electric Light Company is about to start in Pittsburgh, under the patents of a couple of Pittsburghers. We shall be able to give the details in a later edition.

Experiments at a cost of $36,000 are being made at Berne with a view to traction through the St. Gothard tunnel by means of electricity.

Our Mexican Letter.

No. 1.

GUANAJUATO, E. U. MEXICO, August 2, 1882.

GEO. WORTHINGTON, ESQ.,
Proprietor and Publisher
Review of the Telegraph and Telephone.

DEAR SIR,—Fortnightly, on Thursdays, the Alexandre line steamships leave New York City from Pier 3, North River, bound for Vera Cruz, Mexico. The voyage occupies eleven days, including stoppages at Havana, and at Progreso, Campeche and Frontera and is a most pleasant one.

The writer arrived at Vera Cruz, July 2d, on the steamer City of Alexandria, a well managed, well officered vessel, and a good sailer. Vera Cruz (population 24,000) has been called, on account of the prevalence and fatality of yellow fever there, the "graveyard of the foreigner." But during the past year the old inland defense walls, which hindered the free passage of air through the city have been torn down, only the sea wall left standing, and the sanitary condition of the city is much improved. After being rowed ashore, ten in a boat, men and baggage indiscriminately mixed, having our baggage cursorily examined by the customs' officials, exchanging our American dollars for a dollar and sixteen cents each at a broker's office although it is Sunday, those who object on account af the heat or the fever to stay over night in Vera Cruz, take the 11 A.M. train for Orizaba. This is a pleasant summer resort city, distant from Vera Cruz 82 miles, and 3,300 feet up in the mountains. There they pass the night, taking the Monday morning train which leaves Vera Cruz at 6 A.M. Those who stay in Vera Cruz, after a tour of observation through the city and a good night's rest, leave the next morning at six by that most wonderful line, the Mexican Railroad, for the city of Mexico, distant 263 miles. Superintendent Van Valkenburg of the International Cable Company, whose office is opposite the depot, is at the train to bid us farewell. Common rumor has it that this over hill and down dale railroad cost to build twenty-seven million dollars, more than a hundred thousand dollars per mile. It was built by English engineers and English capital thirteen years ago. The engineering difficulties were enormous, a four and a half per cent. grade being necessary at places, while a grade of three per cent., most remarkable in the United States, is not uncommon on this road. Heavy double-cylinder 60-pound Fairlee engines have been imported for this reason, and the results are excellent. The scenery during the greater part of the route is magnificent in rich vegetation, luxurious flowers, birds of bright plumage, growing fruits—bananas, lemons, pine-apples—immense fields of corn and of the maguey plant, from which are concocted the mescal, and the national drink pulque, the former clear as crystal, the latter a whitish fluid tasting like sour milk, with a suggestion of alcohol.

We sit on the left side of the car, or stand on the rear platform to enjoy the view up the mountain, across the great plateau, or far down the mountain side in the valleys below, where the square farming plots, with their varying colors—green with vegetation, or brown with newly-turned earth, and looking small in the distance—will not fail to remind the chess-player of his chess-board. We pass gorges, earthquake clefts, waterfalls, through tunnels by the score, over deep ravines on high bridges, our thoughts often turned from the sublime to the practical by the ubiquitous advertising signs of "Aceite de San Jacobs," and when at nine o'clock at night we reached the capital city, the Mecca of every rural Mexican, with its Brush electric lights shining out of the darkness, we are seven thousand six hundred feet nearer to the sun, moon and stars than when we left Vera Cruz. We have, as strangers, met with a courtesy from all classes so uniform as to be marked, and, as strangers, have paid two prices for almost everything we have bought. Fruits are the exception. Of these, one "real" (12½ c.) bought a large bunch of excellent bananas, one "media" (6¼ c.) bought three pineapples, and other fruits were proportionately cheap. Water, one cent (centavo) per drink—drink as you please.

Three lines of telegraph extend from Vera Cruz to Mexico: the Government line, the railroad line, and the line of the Mexican Telegraph Company. An English iron pole is chiefly used, and No. 8 galvanized iron wire.

Arrived in Mexico (population 258,000), a coach from the depot took us a twenty minutes' drive to the Hotel Iturbide, formerly the Iturbide Palace, and now a moderate priced, conveniently located lodging house. Meals must be had elsewhere. The ordinary daily meals are: café not breakfast, 8 to 9 o'clock, A. M., bread and coffee, nothing more. Breakfast, 12 to 1 o'clock (a good ordinary luncheon), and a hearty dinner late in the afternoon. Many take also a light supper later. We do not. The square, flat-roofed stone houses, with balconies surrounding large "patios," or court-yards, the multitudes of loafing

servants (wages about two dollars per month), the differences in appearance, in dress, in manner, in speech, remind us at every turn that we are indeed "strangers in a strange land," and serve to make doubly welcome the few Americans we meet.

At Calle de San Andrés, No. 18, is the central office of the Mexican Telephone Company, and here, in the company's private office, we find Mr. D. S. Haines, general manager, and his bookkeeper, Charley Bosdet—the latter recently in the employ of the Metropolitan Telephone Company of New York, the former well known in telephone and telegraph circles in Saratoga and Troy, N. Y., and in the New England States. A cordial American welcome is extended to all. In the operating-room are thirteen sections of the Utica Fire Alarm switch, neat and bright as a new pin, and working well. On July 7th the subscribers' list showed three hundred names and was increasing daily. Many of these were not yet connected, owing to a delay in the granting of the local permits for pole lines, but this delay was removed before the date named and all were rapidly being connected. Mr. Henry Wolff, of New York, is now connected with this company.

The clear, ringing sound of the voice, in telephones on these lines, would make the induction-troubled New York telephonist green with envy, while on a wire from Mexico to Queretero, two hundred and forty-six kilometers (say 183 miles) distant, in the territory of the Central Telephone Company, the interference was less than on a good New York to Brooklyn wire. Tests were about to be made between Mexico City and Vera Cruz under the supervision of Mr. Haines and Mr. William Lockwood, formerly of New York. It was at Queretero, fifteen years ago, that the Emperor Maximilian and General Miramon were shot, and the blood-stained coffin of the former is now on exhibition there. At Queretero also is the only opal mine we have heard of.

We visited in Mexico the massive and beautiful cathedral, with its million dollar Madonna, the palace of the President the markets, the plaza, the alameda, the hill of Chapultepec where Taylor fought so well, and where is now located the National Astronomical Observatory. The guard at the gate here refused us entrance because we had no pass. We wrote him one—in English, which he could not read—and were promptly admitted. This place is connected by telephone wire with the central office. The telephone takes well and works well in Mexico, and should prove a great success.

The Mexican Central Railroad passing through a fertile country, over the table lands on a wide plateau 3,000 to 8,000 feet above the sea, bears us in eleven hours to Yrapuato. the presant terminal station for traffic trains, although construction trains run on to Leon, thirty miles further. En-route to Yrapuato we pass through the magnificent valley of Mexico, and along the great "cut of Nochistongo." built during the Spanish rule to drain the valley. It is cut largely into solid rock, is nearly 80 feet wide, of varying depth from 100 to 200 feet, and two miles long. The railroad runs close to its brink. We pass through Tula, and see fron a distance, the church said to be the oldest on the American Continent. It looks its age, and very many of the once grand church buildings that we see are now much dilapidated. A novelty in church bells that I saw, is a long piece of railroad iron suspended in a belfry and struck by the bell-ringer with a smaller piece of iron when ringing time comes. The poorer classes are very poor, and whole towns are habited by them solely (though this is rare) and the possessions of the average "Peon" are in sight when you see the man. From Yrapuato next morning at daybreak by stage coach (la diligencia) drawn by eight galloping little mules, two in the shafts, then four, then two leaders, and with fresh relays every fifteen miles (called a post), we reach the city of Guanajuato at eleven A. M., after a little the roughest riding a man can stand and retain his religion. The railroad will soon be extended to this place.

"And in the summer we came into a land where it is always summer." Instead of summer, read spring, and you have a faithful description of this country and its climate. Cool—always between 60° and 80°, except at night when it is colder though never freezing—clear and bracing, it cannot be surpassed.

The Central Telephone Company, controlling and operating the five central States of Guanajuato, Queretero, Zacatecas, San Luis Potosi and Aguas Calientes, has its headquarters in the city of Guanajuato, and is now under the management of Mr. G. L. Wiley, recently of New York, the newly-elected Vice-President and General Manager, with ample funds and facilities. This company operates under the American Bell patents, secured for the Republic by the Mexican Telephone Company, and has obtained in its own States valuable State and city privileges. Mr. D. J. Hobart, of Boston, an able and experienced telephonist, Assistant General Manager, has been pushing the business here, and in Leon and Queretero, since May. Work has been commenced in Aguas Calientes and San Luis Potosi, and Mr. Wiley starts this week on a tour of inspection, and to establish other central offices throughout the company's territory. Señor Ramos, ex-Superintendent of Government telegraphs of the city of Mexico, has been engaged and assumes charge at Zacatecas. Mr. "Commercial" Jones, late Principal of Jones' Commercial Colleges, is in charge at San Luis Potosi. A valuable branch of the company's business is in lines to and in the hundreds of silver mines near the cities, and in connecting the mines with their "haciendas," where the ore is worked. The ore is brought down from the mountains strapped on the backs of thousands of little "burros"—tiny, docile, patient, muscular Mexican mules, smaller and of a different species from the ordinary Mexican mule; and these we see in almost unending provision. Native labor is extremely cheap. A gang of "peons" (laborers), who learn readily, are hired at 50c. per man per day, while a better class receive only 75c. to $1. Food is cheap, hardware is costly. Labor is cheap, furniture expensive. Living, in general, is much cheaper than we Americans had ever imagined. Ice is a rarity; it is brought down from the mountain tops on the backs of the natives at this place, although in the warmer sections of the country artificial ice of good quality is produced. The writer went this week to the only theater in the city. Doors open at nine; performance, a marionette show, began at 9.30 P. M. Tickets to orchestra chairs "patio" cost three "reals" (37½ cents). There are five balconies; persons occupying the first of these, generally wealthy families, bring their own chairs. Ladies and gentlemen smoke here, as in the street. The footlights were ten oil lamps. We have no gas nor water system.

A touching sight is the funeral of a child. The coffin, partly covered with flowers, is borne on the head of one man, the face of the child often exposed to view, followed sometimes by one mourner, sometimes many, sometimes none. The coffins of older persons are carried to the Campo Santo on the shoulders of men, rarely on horses or in a vehicle of any kind, and a custom, revolting to us, prevails among the lower classes of using the same coffin over and over again, the body at each burial being buried coffinless with hundreds of others in one common grave. Poverty induces this. Sunday is not regarded except as a holiday, or time for recreation. Retail stores are kept open and the streets thronged, crowded with peddlers loudly crying their wares. The bull fights occur on Sundays, and just this once, on next Sunday, the writer has arranged to attend one, in the company of several American and Mexican gentlemen.

In conclusion, I have seen forty-one telephone men here. They were all well, strong and hearty, enjoying the climate, eating the fruits and smoking the cheap but excellent Mexican cigars, and praying for "news from the States." Let them not hope in vain.

I am your friend, G. L. W.

Guanajuato, United States of Mexico, July 30, 1882.

Practical Information for Telephonists.

By T. D. Lockwood,

Electrician, American Bell Telephone Company, of Boston.

The position which Mr. Lockwood holds as electrician to the American Bell Telephone Company naturally gives authority to his work, and any information which it contains we may be sure will be of a thoroughly practical and useful nature. Works which pretend to be merely handbooks of the subject with which they deal are not usually considered to be of more than an instructive nature; but in the book before us Mr. Lockwood has interwoven in a most natural manner a vein of that humor which is seldom met with except in an American, and the result is that the production is both amusing and instructive, and interests while it teaches. Many of Mr. Lockwood's humorous observations are very much to the point, and contain truths which are often unheeded. We have more than once insisted upon the necessity of the apparatus used for testing purposes being not only suited for the object for which it is employed, but also upon such apparatus being handled in a manner consistent with its nature. With reference to this, we find at the conclusion of a chapter on the "Blake transmitter" the following paragraph: "Finally, my brethren, as in all electrical apparatus, when a transmitter is working well leave it alone, and never forget that, when repairs or new adjustment is requisite, the instrument is not a four hundred horse-power Corliss steam engine, but a telephone transmitter."

The first chapter of Mr. Lockwood's book gives a short and well-arranged historical sketch of electricity from the earliest down to the present date. We next have "Facts and Figures about the Speaking Telephone," in which it is stated that the first record of a sound transmitting instrument in connection with which the word "Telephone" occurs, is believed to be the English patent of Sir Charles Wheatstone, No. 2,462, October 10th, 1860, in which are described "Telephones in which musical pipes or free tongues are acted upon by wind." We fancy the use of the word Telephone as a sound transmitter dates considerably further back than 1860. Indeed, some of our readers may remember the well-known "Telephonic" concerts of Sir Charles (then Professor) Wheatstone, given at the now defunct Polytechnic Institution very many years back, in which musical sounds were transmitted a considerable distance through wooden rods. Speaking of Reiss's apparatus, Mr. Lockwood says, "that with this instrument even articulate sounds and words were transmitted, received, and understood by *those who knew beforehand what the words were going to be.*" This remark seems to us a very forcible one, and considerably changes the aspect of the statement of which so much has been made, viz., that Reiss's telephone anticipated Bell's, inasmuch as it actually transmitted articulate speech. Mr. Lockwood very truly and humorously states that "between this telephone and the speaking telephone there was a great gulf as wide as the gulf which, in the parable, separated Dives and Lazarus."

The first telephone line, it appears, was constructed early in 1877, and in May of the same year the first practical telephone exchange was operated.

The construction of telegraph or telephone lines, though dealt with in a few pages, is still dealt with in such a manner as to give a very great amount of useful practical information, small but necessary de-

tails (which are so often neglected) being given. Mr. Lockwood, in giving information, goes straight to the point at once, without introducing his remarks with a quantity of useless matter. All the important elements in connection with telephonic communication are dealt with in separate chapters, and while it is done in an entertaining manner, it is done thoroughly practically; thus any one reading the book carefully, ought to have no difficulty in tracing out and removing such faults as usually occur in the apparatus. The sketch of the telephone inspector as he ought to be, as contrasted with what he often is, might be read with profit by many, and the model copied with great advantage.

To point out the very many excellent points in Mr. Lockwood's little work (for it is but a small one), would occupy too much space, but we can heartily recommend it to all classes of readers. The only fault we can find with the book is, that it is too short and requires illustrations. We are sure that if Mr. Lockwood enlarges and illustrates his present work, he will earn the thanks of many, especially as one can see that he is a man who knows what he is writing about.—*London Electrical Review.*

The Electric Arc in Sulphuret of Carbon Vapor.

Recent experiments of MM. Jamin and G. Maneuvrier on the arc formed by two carbon points with the high tension current from an alternating current Gramme machine, have shown that it depends greatly on the gas surrounding the points. With a high vacuum the arc disappears, and Geissler tube effects supervene. When, however, a few drops of sulphuret of carbon are admitted into the vacuum so as to increase the pressure to 0.05 or 0.06 meters, the arc relights itself between the points and persists when they are separated. There is then a great blaze of light, and the arc attains an abnormal size and brilliance. There is also a long flame which mounts upwards. The points of the carbon are red, and very brilliant, but the arc itself is pale green, and illuminates the surrounding space like a copperous Bengal light. As the pressure is increased the light becomes still more powerful, but as the resistance of the medium increases at the same time the arc is often extinguished, and it is necessary at each instant to relight it by joining the two carbons. Under the spectroscope the light shows all the rays of carbonated gas in combustion, but more complete and more distinct. The green rays are the brightest and give their color to the whole effect. Whilst this action is going on the sulphuret of carbon is decomposed by the residual air; sulphur is deposited on the walls of the vacuum bulb, and the carbon burns. If, however, the air has been highly exhausted no permanent deposit takes place. A volatile deposit, however, forms temporarily on the glass, and appears to consist of sulphur and carbon in some combination not understood. MM. Jamin and Maneuvrier are of opinion that this powerful arc might be used for lighthouse purposes in cases where a green light was required.

Danger from Gas.

An explosion of gas recently occurred at Havana, in the evening, which left part of the city in darkness. It seems that the water main rested on the gas main and both pipes becoming broken on account of settling, the gas entered the houses through the sewers, and there exploded with great force, tearing up floors, demolishing furniture, singeing hair and causing several deaths. Several houses were simultaneously injured in this way. * * * Lillie Vent and Emile Corsie were found in state-room 147 of the Fall River steamer, Providence, on May 5th, unconscious and nearly suffocated by gas with which the state-room was filled. It was taken for granted that they blew out the gas on retiring, but the opinion of Mr. C. B. Dix, published in the New York *Sun* of May 8th last, brings up a different theory on the subject. He says:

I travel on the Fall River boats frequently. The gas often sputters and flickers as if there were air mixed with it or the pressure were not uniform. Last Tuesday night I came down from Fall River in the Providence, and occupied room 145, which is close to, 147. Before I went to sleep I noticed that the gas jet was flickering and sputtering as usual. I paid little attention to it and dropped off to sleep. About midnight I awoke suddenly. My room was full of gas. The flame, which I had left burning at almost full head, had gone out. I sprang out of bed, threw open door and window, and turned off the gas. If I hadn't happened to wake up just at that time I might have been found suffocated in the morning. People would have said that I blew out the gas, and if I had been seen to take a nightcap before I went to bed, it all would have been laid to rum.

* * * Fire Marshal Sheldon in his report on the fires in this city in 1881, states that 32 fires in that year were directly caused by gas, 28 of which were by the igniting of escaping gas, 3 by explosions of gas, and 1 by explosion of a gas meter. He also calls attention to fires from window curtains, goods in stores or show windows, Christmas trees, clothing, drapery and woodwork, ignited by gas jets, lamps and candles, of which fires there were 99 in the year 1881. * * * James W. Langley, of Newport, R. I., was suffocated with gas, on board a Newport boat, at Fall River, Mass. * * * On the 7th of June, Eliot Lavinus, aged nineteen, of Trenton, N. J., was discovered insensible, at No. 176 Washington street, in this city, having inhaled illuminating gas. * * * Jacob Oesterhoudt, of Rosendale, was found suffocated in his bed, at the Mansion House, June 4th, having blown out the gas upon retiring. * * * A terrific explosion of gas, occurred in the Stanton air shaft, Wilkesbarre, Pa., June 15th. One man was instantly killed, and four men were known to be horribly mutilated, with little chance of recovery.

A Constant Battery.

Mechanical agitation has been adopted sometimes to render the current from certain voltaic batteries constant by disengaging the gases which collect on the negative plate. Heating has been recently applied by an Italian engineer, Signor Gaudini, with a like effect in the case of a cell consisting of a cast-iron pot or vessel containing a porous clay vase, in which was placed a plate of carbon, while a zinc cylinder surrounded the vase as a positive electrode. The exciting liquid was a saturated solution of chloride of sodium, and the depolarizer a super-saturated solution of bichromate of potash and sulphuric acid. When in a cool state, this cell gives a strong but rapidly falling current on being worked continuously. If, however, it is placed over a small gas heater, so as to raise its temperature to about 100 deg. C., the current keeps very constant and is very powerful. Crystals of bichromate of potash dropped into the depolarizing solution from time to time serve to keep up the strength of current. When cool, such a cell gave an electro-motive force of 2.10 volts and an internal resistance of 0.82 ohms. When hot, the electro-motive force rose to 2.44 volts, with a resistance of 0.71 ohms. Heating, therefore, increases the electro-motive force of the cell and the conductivity of its solution, while at the same time it lessens the polarization of the electrodes.—*Engineering.*

ANOTHER APPLICATION OF ELECTRICITY.—A new electrical instrument, devised by Captain McEvoy, is likely to be of considerable value in submarine operations, such as searching for torpedoes, sunken vessels, lost anchors, &c., and it may be that submarine telegraph cable work may be aided by its employment. The invention is based on the induction balance of Professor Hughes. The instrument is so arranged that when let down by means of a cable to the bottom of the ocean, the operator, who is listening to a telephone, hears a loud noise when the case containing the apparatus is brought within the influence of the submerged metallic body.—*Ex.*

The Telephone.

To the Editors of the Electrical Review:

SIRS,—The documents sent you by Mr. Silvanus Thompson, in his letter of the 1st instant, relating to the results obtained by Reiss, are evidently interesting, and I shall endeavor to reproduce them in the next edition of my work on the telephone; but they will scarcely alter my ideas as to the share to be ascribed to Mr. Reiss in the discovery of the *speaking* telephone, for if he did effect the reproduction of speech, he only did so, in my opinion, accidentally, for nowhere does he mention the grand principle of the intervention of undulatory currents, which alone could lead to this remarkable result. For sounds to be reproduced by a receiver consisting of *an iron wire enclosed in a helix and stretched on a sounding case placed on a table* (the only Reiss receiver known), the currents sent by this transmitter must have been *interrupted*, and hence the reproduction of articulate speech *could only have been effected accidentally* when the two contacts were by chance maintained one against the other; and as this contact, when prolonged, would stop the sounds on account of the limited extent of the variations in intensity of the currents with such contacts, only irregular and discontinuous effects could be obtained. If the telephonic receiver had been adapted to be held at the car speech might have been heard in a more continuous manner; but I have never heard of a Reiss receiver so constructed. However, according to Prof. Dolbear, Reiss had constructed a model with an electro-magnet and an armature. Was it with this receiver that the effects quoted by Mr. Thompson were obtained?

However this may be, it seems probable that if Mr. Reiss had really penetrated the principle of the articulating telephone he would have substituted for the metallic contacts some of moderate conductivity, so as to obtain a greater extent for the variations in intensity of the currents transmitted, and he would, besides, have arranged his telephone to be applied to the ear, if his principal object had not been to reproduce musical sounds sufficiently loud to be heard at a distance, and by several persons at once. The prospectus of which Mr. Thompson speaks proves nothing, for it is very certain that if the problem of *seeing to a distance* is one day solved, it cannot be said that it was effected two years ago, as the American newspapers said that *a means had been discovered of seeing by telegraph.* At this rate it might also be said that Manzetti, of Aosta, also discovered the telephone, for in 1865 a number of journals announced that he had found out a means of transmitting speech.

It is probable that in this matter, as in the greater numbers of modern inventions, the original inventor obtained only insignificant results, and that it was the man who first succeeded in arranging his apparatus so as to obtain really striking results that received the honor of the discovery, and rendered it popular. Nevertheless, it would not be just not to acknowledge that the Reiss telephone *formed the starting-point of all the others;* and that is what I have said and repeated in all my writings. Mr. Bell himself owned it in his paper, which was read at the Society of Telegraphic Engineers in London. As a last argument I will say that if the transmission of speech had been obtained by Mr. Reiss in 1863, as Mr. Thompson asserts, the discovery would have attracted as much attention at that time as when it was announced to us from America in 1876. I now come to Mr. Henry C. Buck's letter inserted in the

Electrical Review for the 15th inst. It is said there that Professor Dolbear had invented his telephonic system before the date which I have fixed for the researches of M. Herz. If this be so, how is it that the system, the excellent effects obtained from which I observed mys lf at last year's exhibition, was not made public before the middle of the year 1881? Mr. Buck will admit that a writer can only speak of inventions that have become public, and he will also acknowledge that as regards this question of priority we can only depend on the dates of patents or of publications appearing at certain periods. Now, the American journals, at any rate those we have received in France, did not begin to speak of Professor Dolbear's telephone with condenser until the middle of 1881, and even after having described M. Dunand's system. Mr. Buck, in his letter, does not touch upon the date of Professor Dolbear's first researches. It seems to me, however, that instruments of such importance deserved to occupy the attention of scientfic journals as soon as they were constructed. All that I can say is that the patent of Dr Herz dates from the beginning of June, 1880. I will also say to Mr. Buck, as well as to Mr. S. Thompson, that, being in no way interested in this question of invention, I wish to write in the interests of truth alone, and that when my assertions are *proved* to me to be incorrect I am quite ready to rectify them. TH. DU MONCEL.

Another Newspaper Office to be Lighted with the Edison Electric Light.

The plant in the Public Ledger Building has proved so satisfactory that another Philadelphia newspaper, the *Public Record*, has decided to introduce the Edison Light. The plant will consist of one K dynamo, 250 A lamps, to light the new *Record* building now being built on Chestnut street.

The Treasury Bureau of Statistics has issued a bulletin giving the figures of immigration for the fiscal year ending June 30. The total arrival of aliens was 816,027. The total of immigrants, properly so called, was 789,003. We give the nationalities in tabular form:

Germany	249,505
Canada	98,308
England	85,177
Ireland	76,432
Sweden	49,76
China	39,575
All others	190,244

The numbers arriving at the principal ports were as follows:

New York	502,171
Boston	58,188
Baltimore	41,759
Philadelphia	36,285
Huron	71,424
San Francisco	32,668

The total for the month of June was 84,786, while the corresponding month last year showed 95,535. A comparison with previous years shows an astonishing increase in the number of arrivals. In no other year have they ever reached 500,000. The authorities predict that the next year will show an advance over this as large as this one shows over the previous years. These figures are worthy of study. The great increase of immigration from Germany, and a corresponding decrease in that from Ireland, are noticeable facts.

A Cheap Electric Pile.

Mr. Alfred R. Bennett, engineer for Messrs. D. & G. Graham, of Glasgow, read before the Philosophical Society of Glasgow, on the 7th of February, a very interesting note on a new pile invented by him.

This pile is composed of an iron vessel (enameled or not) of a porous cup, and of a strip of zinc. The space between the iron vessel and the porous cup is packed with iron in small fragments, such as lathe turnings, and the porous cup is filled with a solution of caustic soda or potash.

The idea of this combination is based upon the well-known fact that iron does not rust in solutions of the caustic alkalies; and experience has shown that if a strip of iron and one of zinc are immersed in such a solution the iron becomes strongly electro-negative with respect to the zinc. It is the same with silver and gold and the metals belonging to the platinum group.

Primarily carbon is slightly more electro negative than metals with respect to zinc; but all such superiority soon ceases on account of the absorption of hydrogen by the pores of the carbon. Iron offers peculiar advantages. It is very cheap, and its solidity permits of attaching the connecting terminal, which is something that cannot be done with carbon. It has been found, however, that an iron plate becomes rapidly polarized, because the hydrogen which is disengaged attaches itself to it and greatly increases the resistance. This difficulty is overcome by the use of small fragments of iron, because hydrogen disengages itself therefrom more readily than from a continuous surface. In order to facilitate such disengagement it is necessary to have care that the fragments be only wetted and not immersed in the solution; then the pile acquires to a high degree the faculty of preserving its electro-motive power while working continuously under a feeble resistance. Under a resistance of twenty ohms the pile remains quite constant, and resumes, through rest, its electro-motive power rapidly enough to permit its being employed on the most active telegraphic circuits, and for the majority of practical purposes.

This electro-motive power varies with the nature of the iron, the purity of the solution employed, and the degree to which the iron is moistened by the solution.

The electro-motive power of a Daniell pile being 1, that of a Leclanché is, at the most, 1.30, and that of an iron pile varies from 1.15 to 1.33. This latter figure is exceptional, and 1.23 must be taken as the mean.

Mr. Bennett's pile has given good results in the experiments that have lasted for several months.—*Revue Industrielle.*

The Big Rockaway Hotel Leased.

The big hotel at Rockaway, built by the Rockaway Beach Improvement Company, has been leased by the reorganization trustees to a syndicate of business men of this city. The lease is for five years absolutely, with an option for the lessees to extend the lease three years after that time. The syndicate is composed of some of the members of the reorganization committee and some of the outside creditors, but mainly of capitalists not heretofore connected with the project. The hotel will not be opened until next season. There is some work yet to be done to finish the building; it needs repainting and furnishing, and the grounds are to be handsomely laid out and improved. The cost of this work is estimated at $200,000, which will be provided for by a first and only mortgage on the property, to be placed by the reorganization trustees. The hotel has already cost its projectors about $1,500,000, exclusive of $700,000 paid for the land and raised by the stock issued by the old improvement company. The building is said to be in good condition so far as it is finished. Some well-known and experienced person will be chosen to manage the hotel. The members of the syndicate are confident of being able to make the enterprise a success next year.

La Lumiere Electrique gives illustrations of three small pieces of apparatus lately exhibited in Belgium. The first is a telegraphic sounder in which, by way of strengthening the sound, the armature is terminated by a small hammer which strikes on a brass drum. Next a harmonica, devised by M. Somzee, for indicating the presence of fire-damp, consists of a flame burning in a glass chimney, the draught being so regulated that the flame is silent in pure air, but begins to sing when a certain proportion of fire-damp is present. The third apparatus, also by M. Somzee, is an electric regulator, in which inclined passages conduct fine carbon powder into the arc, increasing the number of solid particles raised to incandescence (an idea M. du Moncel does not think practical).

French Association for the Advancement of Science.

The eleventh session will be held at La Rochelle from the 24th to the 31st of August, 1882. The programme of the session comprises a general inaugural meeting, section sittings, scientific or industrial visits, public conferences, and excursions. Several questions relating to electricity will be treated; amongst others we may mention a paper by M. Marcel Brillouin on the method of comparing co-efficients of induction; the causes of errors and the means of avoiding them; a communication from M. Debrun, professor at the Lycée of Paris, on a capillary registering electro-meter, and the general distribution of electricity. M. Tissandier will expound his researches on small batteries, and M. Hospitalier will hold a conference on the electric light. We shall endeavor to keep our readers well informed concerning the electrical subjects presented to the association.

Improvements in Accumulators.

In these times of new electrical companies we cannot too strongly recommend to capitalists the particularly ingenious method discovered by M. C. Blanchart, honorary engineer of the mines at Brussels, of obtaining electric accumulators of a capacity far superior to any that have been made at present—on paper, that is. We know that, according to experiments of Sir W. Thomson, and those of MM. Tresca, Joubert and Pothier, at the Conservatoire des Arts et Métiers, at Paris, the Faure accumulators can store up work equivalent to one horse-power during one hour, with a weight of about 75 to 80 kilogrammes, or 4,000 kilogrammeters per kilogramme of accumulators under the most favorable conditions. M. Blanchart arrives at the figure of 11,371 kilogrammeters with his improved accumulators. Only—there is an only—M. Blanchart in his calculations only takes into account the weight of the lead and of the minium – the vessel and the acid are not reckoned—and, besides, he says that the discharge is effected with a *constant* electro-motive force of 2.15 volts, which is incorrect, since the intensity of the current through an unknown resistance at the commencement of the discharge is 13.33 amperes, and at the end of it is only 8 amperes. This change in the intensity is not produced without a decrease of electro-motive force, but it is convenient not to take this into account in the calculations because it increases the total result. But there is still more to be said. M. Blanchart, by reckoning the weight of the oxidized plates only, and ignoring the fall of potential during the discharge, arrives at the fantastic figure of 23,600 kilogrammeters per kilogramme of active material. It seems to us, however, that the reduced lead which becomes oxidized during the discharge, may also be considered active material. Adopting M. Blanchart's method of calculation, rather less than 12 kilogrammes of active material were sufficient to produce one horse-power-hour of electrical energy. We sincerely hope this is the case,

but it is impossible to accept it merely on the calculations of the inventor, who, aiming at simplification, ignores to too great an extent important factors. In conclusion, we may add for the benefit of those who may intend to verify our remarks, that M. Blanchart's calculations are given at length in the *Annales de l'Electricité* for July 15th, 1882, page 204.

Telegraphic and Telephonic Notes.

Old Time Telegraphers' Association.

The following notice has just been issued :

JULY 31, 1882.

The second annual re-union of the Old Time Telegraphers' Association, postponed last year on account of the death of President Garfield, will take place at Niagara Falls, on Wednesday, September 20, 1882 The committees—holding over—will please act in their several capacities.

By order of the association.

O. H. BOOTH, President.

J. C. MATTOON, Secretary.

Jay Gould has sold to the Western Union Telegraph Company about 40,000 shares of the Mutual Union Telegraph stock, including the 33,000 shares which he purchased en block a few months ago. It is stated officially that Mr. Gould sold at the same price at which he purchased, and that the cost to the Western Union is less than $6.50 per share. The voting power of the 30,000 shares and also upon 18,000 other shares, a majority of the capital stock, is held by Mr. Gould and President George F. Baker of the First National Bank by an irrevocable joint power of attorney in accordance with the contract under which Mr. Gould purchased a third of the Mutual Union stock.

A New Cable Project.

WASHINGTON, Aug. 2.—Mr. Lapham reported from the Senate Committee on Foreign Relations, with amendments, to-day, the Senate bill authorizing Samuel L. M. Barlow, Orazio Lugo of New York, and Albert G. Buzby and others of Pennsylvania, to construct a line or lines of submarine cable between America and Europe. The measure, after an unsuccessful effort by Mr. Lapham to secure its immediate consideration, was, upon his motion, ordered printed with the amendments and recommitted.

Defects in Deep-sea Cables.

The Scotia has now been about two months in the Atlantic repairing the Brest St. Pierre cable for the Anglo-American Company, and she had recovered the cable in about 1,940 fathoms of water, repaired it, and put in sixty miles of new cable. She is now engaged in repairing the fault which has existed for some time in the cable near Brest. It is a great thing to do—to lift the cable which has been down for twelve years in mid-Atlantic and to repair it. The cable taken out was in very good condition considering the long time it had been down, but there were traces of defects at short intervals of the cable, owing to some chemical action at the bottom of the sea.

The form of an oath should be administered to compositors. In Lawrence, where it has been very warm this summer a daily says "a New York daily by the substitute of a *b* for an *o*, makes the curious statement that magistrates shall be empowered and required to administer baths to the defendant before the examination!"—*Lowell Courier.*

Our readers we think will be delighted with the graphic and spicy Mexican letter from Mr. Wiley in this edition, which we trust will soon be followed by others of a like nature.

Telegraph Messages.

AN IMPORTANT QUESTION FOR THE OHIO COURTS TO DECIDE.

DAYTON, O., August 6, 1882.—Suit was brought in this city yesterday by the Mutual Union Telegraph Company against the Western Union Telegraph Company, to compel the latter to accept and transmit dispatches offered to it by the former. The Mutual Union company has placed electric call bells, at its own expense, in all the offices of its patrons, by which messengers are called from the Mutual Union office to carry messages to be telegraphed. The Mutual Union company was organized only nine months ago and now operates 40,000 miles of wire, but there are some points where it has not yet established offices. When, in response to these calls, a messenger brings a message to the office which is destined for a point which is not reached by the Mutual Union lines, the message is turned directly over to the Western Union instead of subjecting the patron to loss of time by sending it to him and having him send it to the Western Union office. By instructions from higher authorities, the manager here has refused to receive messages from the hands of the Mutual Union. The Western Union claims that the Mutual Union is representing that it can do all the business of its patrons, when it can do only a part. Section 3,462 of the Revised Statutes of Ohio provides a penalty of $100 for each case of refusal by any telegraph company to accept messages offered by any other company or individual, and the Mutual Union will bring suit in ten cases under this law. A temporary injunction has been granted, compelling the Western Union to receive messages from the Mutual Union pending the suit. The result of the suit will establish an important precedent.

The Proposed New Canadian Cable.

We called attention some time ago to the new corporation known as The European, American, Canadian, and Asiatic Cable Company (limited). It is incorporated, it will be remembered, under an act of the Dominion Parliament, and its principal objects were outlined in our former articles. It has now issued a prospectus, and the advertisement, to be found in another column, shows that it is to be conducted on a system of mutual profit. A contract has been made with Henley's Telegraph Works Company for about 6,120 miles of cable, comprising two complete cables between England and Sable Island, Nova Scotia, and connection with Canada and the United States, for £1,445,176 sterling, to include the manufacture, laying, and landing, and keeping the cables in working order for thirty days after laying, and all the preliminary expenses up to allotment, except £6,000 for the cost of obtaining the Act, the company taking £350,000 of shares in part payment. The capital of the company is to be £1,500,000 sterling, in £10 shares. The company has power to lay cables from our Pacific coast to Japan and other parts of Asia, and to connect with the Government's lines of wire. On the "mutual" principle, it is proposed to make special distributions of part of the profits among those shareholders who bring in business. The company means to charge only ninepence a word for messages between England and Eastern Canada, and hopes to develop the use of their lines by the press by means of special inducements. It is claimed that the mutual principle is guarantee against amalgamation with any of the existing cable companies. All information may be obtained of B Batson, Esq., Ottawa, to whose untiring exertions the passage of the bill through Parliament is mainly attributable.—*The Shareholder.*

Accuracy in Telegraphing.

When the telegraph was first established, with a new system of representing words, and of necessity employing operators new to the business, there was reason enough in supposing that a large allowance should be made for operative errors. Under the conditions then existing the stipulation of the telegraph companies that they would not be responsible for mistakes unless the message be repeated was not altogether unreasonable. That the public should submit to the same one-sided regulation, now that telegraphing is no longer a novelty, is simply absurd, or worse, since it allows the companies to shirk the proper consequences of employing under-paid and incompetent operators. At current rates there is no business that can better afford to furnish the best of servants and service than telegraphing, and with the present development of the art there is no more justice in throwing the presumption on the side of inaccuracy and requiring the public to pay two prices to insure the correct delivery of their messages than there would be in applying the same rule to any other service.

The baker who should offer bread at the current rates, refusing to guarantee full weight and sweetness except for double price, would soon discover that the public did not approve of that way of doing business. And the same experience would befall the tailor, shoemaker, carpenter, common carrier, or other man who should attempt to operate on the plan of non-responsibility except for double prices.

The lack of competition and the easy submission of the public to inherited customs have made it possible for the telegraph companies to continue the practice. At last, however, some one has had the spirit to dispute the right of the companies to make the law for themselves, and the United States Court at Leavenworth, Kan., has justified his action The court held "that any rule or regulation of the company which seems to relieve it from performing its duty, belonging to the employment, with integrity, skill, and diligence, contravenes public policy as well as the law, and under it the party at fault cannot seek refuge. If it becomes necessary for the company, in transmitting messages with integrity, skill, and diligence, to secure accuracy, to have said message repeated, then the law devolves upon them that duty."

It is to be hoped that this decision is as well founded in law as in reason, and that in case of appeal the higher courts will sustain the lower. There is no reasonable excuse for inaccuracy in the transmission of telegraphic messages. The instruments make no mistakes, and it is possible, by double instrumental records or otherwise, to insure the certain delivery of the message received. It might evolve a little more care and a higher grade of operative ability; but the companies can afford that, and the public should accept nothing less from the companies than a full and exact discharge of the duty undertaken by them.—*Ex.*

Agitation Among Telegraph Operators.

Pittsburgh, Pa., is the headquarters of the Executive Board of the United Telegraphers of North America and the Brotherhood of Telegraphers, numbering altogether about 18,000 operators, male and female. A strike having arisen in Denver, Col., the dispute went to that city, and for some time the Executive Board were in conference, and there were expectations of a general strike commencing at once. After considerable discussion, however, the strike was at least postponed for the present, though it was decided to sustain the Denver strikers. The facts in the Denver strike are as follows: Last month the operators employed in the Denver office of the Western Union Company, who heretofore have been

working for $75 per month, respectfully petitioned Superintendent Bates, of that division, for an increase of salary of $5 per month, to take effect on the 1st of this month. No attention whatever was paid to this petition, and on the first the operators in Denver left the office in a body at five o'clock in the morning. In addition to this difficulty about salary they had another grievance in the shape of having to work eight and one-half hours per night instead of seven hours, as in other cities. Two hours after leaving the office Superintendent Bates sent for the men and told them to go to work, saying that the advance in salary had been granted. The operators went back to their keys and worked faithfully until Wednesday. On the evening of that day Superintendent Bates received word from the Executive Committee of the Western Union Company in New York saying that they would not sustain his action in advancing the salaries of the operators $5 per month. As a consequence the Denver men went out on a strike. They will be helped, financially and otherwise, by the Brotherhood.—*Ex.*

Jay Gould's Telegraph Stock.

The rumor that Mr. Jay Gould has sold his holding of Mutual Union Telegraph stock to the Western Union Company has for several days been a subject of comment among speculators and investors. In the absence of Mr. Gould from the city, there has been no positive confirmation of the transaction. No doubt of it, however, is entertained by well-informed operators. By some it is not regarded as of great importance, for the reason that Mr. Gould's interest is believed by them to be smaller than the public generally have supposed. Mr. John G. Moore, President of the Mutual Union Co., said yesterday: "I have heard the report about the sale by Mr. Gould of his stock, and have no reason to believe that it is not true. It has not yet been recorded on the books of the company, but that is a fact of no significance. Mr. Gould's holding was comparatively small—something like twenty thousand shares, I think. He did not have control of the company, and the transfer will not affect our policy in any way. We are entirely independent of the Western Union, and our business is daily developing as we extend our facilities for transmitting messages."

Secrecy of Telegrams.

Replying to Mr. Pulestown, in the House of Commons, on Thursday, the 13th ult., Mr. Fawcett said that the practice which had hitherto prevailed in the post-office was not to give up telegrams, except on the application either of the sender or receiver. Some doubt, however, has arisen whether they had legal power thus to give up telegrams, and in view of this legal doubt he proposed in the Post-office bill shortly to be introduced to insert a clause which would place telegrams, with regard to secrecy, in the same position that letters now were.—*Exchange.*

Telephone Injunction.

Argument was heard by Judge Haight, in Supreme Court, Chambers, yesterday, on an application to continue an injunction restraining the Commercial Telephone Company from leasing its plant, franchises, &c., to Walter F. Hascomb, Nathan D. Wendell, A. B. Uline, Daniel Manning, Edward Newcome and John Doe. The proceedings were instituted on behalf of the Western Union Telegraph Company, which claims to be the holder of a one-sixth interest in the Commercial Telephone Company, which the latter offered to purchase at the rate of $125 a share. On the other hand the complaining company offered to buy a majority of defendant's stock at $160 a share, which was refused. It is sought to restrain the making of the lease on the ground that it would be injurious to the plaintiff's interest. On the argument the plaintiff was represented by General Wager Swayne and Mr. Nathan Hale, and the defendant, whose office is in Albany, by Mr. Rufus W. Peckham, of that city. On the part of the Western Union and others interested on that side it was asserted that all information as to the workings or doings of the defendant company had been refused them. On the part of defendant Mr. Peckham argued that all the statements of the plaintiff were made upon information and belief. These allegations were emphatically denied in the papers of the defendant, no such lease as that charged ever having been made or proposed to be made.

General Swayne said he had been taken by susprise by the papers of the defendants, in which plaintiff's allegations are denied, and he thonght the case should go before a referee to take testimony. As he understood the facts it was proposed to transfer the entire property of the Telephone Company, in which plaintiff was interested, to a new company in which defendants had entire control.

Judge Haight reserved his decision.

New York, Aug. 3, 1882.

Telephones in England.

It is well known that the telephonic industry in America has made enormous strides, while in England the matter has made but little progress. Now, however, that the granting of the licenses for the formation of telephone exchanges has been decided upon by the Postmaster-General, there appears to be no reason why we should not soon be on level terms with our American cousins. The towns of England are comparatively such short distances apart, that we have unusual facilities from this fact alone. Again, the undulatory current is not claimed in this country, but it is the United States. Therefore we may soon expect to see England to the fore with the telephone. —*Electrical Review.*

In Paris the project of rapid transit by means of elevated railroads seems to have been abandoned in favor of an underground line. According to present plans the total cost of construction will be about $30,000,000. The fare will be ten cents for first-class and four cents for second-class passage, but tickets will be issued to workmen at two cents.

There are nearly 18,000 locomotives in use in the United States. Of these, 2,700 are in the State of Pennsylvania, New York coming next with 2,000. Illinois has 1,900; Georgia and Virginia 300 each; and Florida, 30. The Middle States have 6,000; the Western, 7,800; New England, 1,700; the Southern, 1,800; and the Pacific States, 420.

On Dec. 31, 1878, the distribution of the population of Egypt was as follows: Cairo, 327,462; Alexandria, 165,752; Damietta, 32,730; Rosetta, 16,243; Suez, 11,327; Port Said, 3,854; other towns, 11,747; provinces, 4,948,512; total, 5,517,627.

The great iron strike has lasted two months, and the strikers have lost about $4,000,000 in wages in the Pittsburgh district alone. About twenty establishments, whose workmen went into the strike, have resumed operations.

The Texas & Pacific Railroad will establish experimental farms along its line next season. The purpose of these farms will be to test the availability of different lands for farming purposes.

General Telegraphic Miscellany and News.

In opening our new columns of General Telegraphic Miscellany and news from 195 Broadway, it is, indeed, superfluous for us to remark that these bright and racy items are from the well-known and familiar pen of Mr. John Lenhart, they speak for themselves now as in the past, and will never be less interesting than in the future editions of this journal. Managers, operators and the public will always look with interest for something from John, as he gets the latest news and has always something interesting to tell us.

New York exchanged 1,600 messages with Boston, August 2d, between 8 A. M. and 5.30 P. M.

Mr. A. H. Seymour, the manager of the Mutual Union General Office at 135 Broadway, N. Y., began his connection with the telegraph in Chicago on the Erie & Michigan Telegraph Co., a line which extended from Buffalo to Milwaukee. This was fully twenty-five years ago. Mr. Seymour remained in Chicago for several years, and came East about twelve years ago, and was for a long time connected with the W. U. & A. & P. Cos. before entering the services of the Mutual Union. Mr. Seymour is a first-class operator and entirely familiar with everything appertaining to telegraphy. The Mutual Union has had several managers since they began operations, but with Mr. Seymour's well-known ability and reliability and clear record for the past twenty-five years, the company can feel satisfied that their interests are in good, safe, trustworthy hands, and all that can be done will be done for the best interests of the company by the present manager.

Mr. Seymour is a well-read gentleman and in every respect thoroughly familiar with general business matters, and in his intercourse with the general public and telegraphers particularly has made many friends by his agreeable and considerate manner.

Mr. W. J. Dealy, the New York manager at 195, has been principally connected with the cable business since his advent in New York, and he is supposed to be well informed in regard to everything and every detail in that branch of the telegraphic service.

Col. W. B. Clum, who was in very bad health in the spring, has entirely recovered his health and spirits, and looks improved in every way and appears to have taken a new lease of life. The Colonel is one of the oldest operators in the United States, and has formerly been manager at Boston and Halifax, and for many years chief operator with the A. & P. at 145 Broadway.

Mr. McGinnis, of the Continental Hotel Philadelphia wire, is one of the prominent old-timers at 195. Mr. McGinnis has been connected with telegraphy from the very beginning, and he is also an inventor himself, and the signaling apparatus and the indicator which shows where the elevators are and whether coming up or going down at 195 is his invention. He has also invented a hotel annunciator and several other electrical appliances.

Richardson has resigned and goes with the Mutual Union.

J. W. Kates, superintendent at Lynchburg, Va., has resigned.

The "Colby Arbuckle Concert Co." have made overtures to Mr. D. W. McAneeny, tenor, for the coming season for a concert tour. The proposal is under consideration, and if satisfactory arrangements can be made as to leave of absence during winter from office and church choir, he will probably accept.

Assistant General Superintendent Merrihew has just returned from a Southern trip.

Mr. Paynter, manager at Richmond, Va., has resigned.

Mr. Thomas Brennan is filling the position of assistant manager at 195 Broadway.

R. H. Morris, the electrician of the office, is running the wires for the C. N. Department on the elevation at 195.

Al. Baker, formerly of Chicago, is on the night force, so is Mr. Swan.

It is not at all surprising that operators should prefer to work in the W. U. New York office to any other place in the country. The Western Union building is the finest structure on Broadway, and is complete from bottom to top with every convenience and comfort, with lunch rooms, coat rooms, and everything that is necessary to the well being of the employees.

During the summer season when the brokers are at Long Branch, Saratoga and Newport and elsewhere, the leased wires are particularly active, and Mr. Moffatt who looks after them at 195, is kept very busy. Mr. Wm. Maver also assists him when there is a heavy pressure.

Baron Scully, the celebrated printing operator, is now with the Fuller Electric Light Co., of which Mr. Chandler, formerly of the W. U., and latterly president of the A. & P. Co., is the president.

Wm. Blanchard nightly shies his castor into the arena, and makes it warm for the boys on the printing motor at Washington. William looks fat and rosy, and night work has got to be a second nature for him, and he prefers it to day work. He has been working nights for fifteen years past.

Catlin and Meyer continue to make things hum on the Boston and Eastern circuits. Catlin gives most attention to the switch and supplying wires, while Meyer looks after the business. Catlin has got all his wires by heart, and he can locate a defect or cross in less than no time, or open a way for business when there is any unusual rush.

James Crate, of the Hartford wires, turns out the most beautiful copy in the office. Spencerian penmanship is no name for it. Getz follows closely.

James Callahan has had Fall River cut off from his "lay" since the opening of the summer resorts, and Doyle is doing the calico town, while Mr. Callahan has his hands full attending to Newport alone. Callahan showed us some beautiful etchings the other day. He is an artist and no mistake.

Denny Harman, Jr., cable chief, still remains at 195, looking after the cable business. The rest of the cable staff are all at 16 Broad street, except Mr. Hues, who has gone on the Cincinnati circuit.

Mr. Fitch, the popular chief at 8 Broad street, is one of the most popular men in the business, and he makes it a point to make everything pleasant and agreeable for all hands at this office.

Ex-Gov. R. B. Bullock, formerly of Georgia, was in the office on the 8th, and was shown about the office by his former fellow-craftsman and confrere, Mr. Edwards of the printing motor.

We regret to learn of the severe illness of Professor Goodyear, Principal Manager of the firm of L. G. Tillotson & Co., and hope that he will soon be able to be about again.

Court Cunningham and Tierney are still on the race wires, and they do some remarkable fast work there. Messrs. McAneny and Coleman are also on this class of work.

The other evening in order to enliven my drooping spirits and put my mind into such a frame or state as to be able to write up this column for the edification of the many readers thereof, I dropped into the Metropolitan Alcazar on Broadway near the Rossmore, and while listening to the enchanting music and observing the splendid ballet and the other superb attactions of the "Merry War," I espied our old friend Mr. J. D. Reid among the audience. He was in his usual amiable frame of mind and invited us to take a glass of "Pommery Sec." While I sat conversing with the veteran telegrapher, my whole telegraphic life came up vividly before me. I first saw Mr Reid when I was a boy of 17. He was then the General Supt. of the National Telegraph Co. I had a country office called Beaver, Pa., 25 miles below Pittsburgh, and one day I went up to the "city" after clothing made by a tailor, there being no artists sufficiently stylish in Beaver to suit me, and while calling on T. B. A. David, I met Mr. Reid for the first time. He has been connected with the telegraph ever since then, and that was fully thirty years ago. Mr. Reid is in fine health apparently, but he is quite gray and has been for years past. We hope his life may be spared for many years, but be the time far off or near at hand, we know of no one who has by a correct, honorable and circumspect life laid a better foundation to be able to meet whatever fate may be in store for him.

In view of the many changes that have been made here, it may not be out of place to say that they all meet with the approval of the employees. Some men have been occupying prominent places who were totally unfit for the places, and we are pleased to know that the fact has at last been discovered.

Undoubtedly the heaviest and fastest work done in New York offices is on the Boston Quadruplex. At a recent trial of speed the best average ever made out of the office was on this quad., some 1,500 messages being handled at an average delay of only 2 mins. 15 secs. The gilt edge artists are Messrs. Ed. Keene, Geo. Dalton, John Kerrins and Geo. Newton. This high standard is also kept up by the night men on this wire, among whom are Harry Cunningham, Walter Wright and the well known "Hank" Smith.

It is when a sudden storm springs up and the wires suddenly cease to work that the Wire Chief shows his ability, and it is at such times and under such emergencies that his quality is best shown and as to whether he possesses any real ability or not. As wire after wire fails and business accumulates he is accordingly more or less affected and his knowledge of routes and wires is brought into full requisition, and his energies attacked to their utmost extent. Fred. Catlin, the Eastern Wire Chief, is always undaunted under such circumstances and never allows himself to be submerged, but keeps business clear and under full headway while there is a single wire left.

During these hot days when the heat in the city is almost unbearable and when a Troy collar goes down in less than five minutes after one enters into the sweat box, those people who are so fortunate as to be able to go to the seashore should be truly thankful. To say that it requires all the courage one can muster to worry it through from 8 A.M. to 5.30 P.M. is nothing more than the exact truth. Mr. Voger had a few days' exhalation of the fresh sea breezes at Newport and returned for duty, but after three days he gave up the attempt and goes away to remain until the weather changes sufficiently to make it endurable in the office.

Col. Robert C. Clowry, the Western Union Genl. Supt. at Chicago, Ills., has been here at 195 in consultation with the Genl. Manager for some days past. The first time we ever saw the Col. was fully 25 years ago. We were passing through Springfield, Ills., on our way from Detroit to St. Louis, and we laid over a night upon receiving a pressing invitation from "Bob," who was then the manager of the Springfield office which was on the Caton lines. We were shown all the sights of the little town, and the next day we left over the Alton road. Col. Clowry still retains his old-time popularity with the telegraphers at large. When I think of those times in the past I am often very much amused, for the only reason I had for leaving so pleasant and agreeable a town as Detroit and going into such a country as I eventually got into (for when I got to St. Louis they sent me 300 miles up the Missouri River), was that I had read a great deal about slavery and I had as extravagant and ridiculous notions upon the subject, and wished to investigate it.

Sheep placed on Key West Island lose their wool in the second year.—*N. Y. Sun.*

Lambs who wander into Wall street, usually lose it in the second hour.—*Puck.*

Chorus of Shorn Lambs.

I.

The gods who in heaven abide,
And preside o'er the planet of man,
To stimulate laudable pride
In his heart, since time began;
For mortals a law have cast,
As the pitcher is cast for the ewer,
That the slow alone shall last,
The gradual only endure;
And that wealth which grows in a night,
In a night shall fade away,
As the morning mists take flight
At a glance of the eye of day.

II.

Success is labor's prize,
Work is the mother of Fame:
And who on a "boom" shall rise
To the height of an honest name?
The bee by industry reapeth
The stores which enrich the hives:
All that is thrifty creepeth,
For toil is the law of lives.
And he who reaps without sowing,
A bitter harvest reaps;
The law of gradual growing
Is a law that never sleeps.

—ROBERT GRANT.

J. C. Hinchman, late General Superintendent, is Superintendent of the Building and Construction.

Tom Dolan, late Night Manager, is doing chief duty in the daytime now.

The Western Union Company are putting up a large tube or pipe which will extend from the bottom of the building into the operating room, and they will by machinery force fresh air into the operating room. This will no doubt be a great benefit to all engaged in the crowded room.

If we could only follow the Irishman's advice we should be wiser and sadder, if not better men. When drilling an awkward squad, his patience thoroughly exhausted, he cried out, "Do ye call that a pr'sint arms? Hivens! Just step out here, now, and take a look at yourselves."

A recent pay bill of John Elder & Co., the Clyde shipbuilders, amounted to over $115,000 for fifteen days' labor. Nearly 6,000 men are employed in the yards.

NEW PATENTS—ELECTRICAL—1882.

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING JULY 18TH, 1882.

261,303. Apparatus for Charging and Discharging Secondary Batteries. Charles E. Buell, New Haven, Conn. Filed May 19, 1882. (No Model.)

261,410. Automatic Telegraph-Transmitter. Henry Van Hoevenbergh, Elizabeth, N. J. Filed May 16, 1882. (No Model.)

261,503. Automatic Incandescent Electric Lamp. William L. Voelker, Morton, Pa., assignor to John H. Irwin, Trustee. Filed Jan. 23, 1882. (No Model.)

261,288. Coupling for Commutators and Armature-Wires. James J. Wood, Brooklyn, N. Y. Filed Oct. 26, 1881. (No Model.)

261,261. Carbon for Incandescent Lamps. Henry A. Seymour, Washington, D. C., assignor to George W. Stockly, Cleveland, Ohio. Filed Dec. 17, 1881. (No Model.)

261,264. Carbon for Electric Lamps. Henry A. Seymour, Washington, D. C., assignor to George W. Stockly, Cleveland, Ohio. Filed Jan. 10, 1882. (No Model.)

261,234. Device for Cleaning Electric Lamp Globes. John Jameson, Newcastle-upon-Tyne, England. Filed April 10, 1882. (No Model.) Patented in England, October 12, 1881, No. 4,439.

261 390. Dynamo-Electric Machine. Daniel A. Schuyler, New York, N. Y. Filed Dec. 27, 1881. (No Model.)

261,157. Electric-Lamp Fixture. Daniel N. Hurlbut, Chicago, Ill. Filed June 15, 1881. (No Model.)

261,172. Electric Bell. Henry B. Porter, Chicago, Ill. Filed Mar. 6, 1882. (No Model.)

261,187. Electrical Switch-Board for Metallic Circuits. Theodore N. Vail, Boston, Mass Filed Apr. 28, 1882. (No Model.)

261,260. Electric-Light Mast. Henry A. Seymour, Washington, D. C., assignor to George W. Stockly, Cleveland, Ohio. Filed Feb. 13, 1882. (No Model.)

261,262. Electric-Light Apparatus. Henry A. Seymour, Washington, D. C., assignor to George W. Stockly, Cleveland, Ohio. Filed Jan. 14, 1882. (No Model.)

261,280. Electric-Arc Lamp. Charles J. Van Depoele, Chicago, Ill. Filed Feb. 11, 1882. (Model.)

261,289. Electric Lamp. James J. Wood, Brooklyn, assignor to the Fuller Electrical Company, New York, N. Y. Filed Jan. 28, 1882. (No Model.)

261,352. Electric Lantern. John H. Irwin, Morton, Pa. Filed Nov. 12, 1881. (No Model.)

261,490. Electric-Lighting and Power-Distributing System. Eli T. Starr, Philadelphia, Pa., and William J. Peyton, Washington, D. C. Filed June 20, 1882. (No Model.)

261,263. Incandescent Lamp. Henry A. Seymour, Washington, D. C., assignor to George W. Stockly, Cleveland, Ohio. Filed Dec. 16, 1881. (No Model.)

261,351. Indandescent Electrical Illumination. John H. Irwin, Morton, Pa. Filed Dec. 28, 1881. (No Model.)

261,129. Magneto-Electric Machine. John. B. Blair, Chicago, Ill., assignor of three-fourths to Aaron P. M. Jeffers, William S. Coffman, and Charles W. Lasher, all of same place. Filed May 4, 1882. (No Model.)

261,472. Multiplex Electric Lamp. Hans J. Mullet, New York, N. Y., assignor to himself and Alexander Levett, of same place. Filed Aug. 20, 1881. (Mo Model.)

261,513. Mode and Device for Charging and Discharging Secondary Batteries. Charles E. Buell, New Haven, Conn. Filed May 19, 1882. (No Model.)

261,189. Sectional Pipe for Underground Electrical Wires. Nathan U. Walker, Walker's, Ohio. Filed Feb. 15, 1882. (No Model.)

261,379. Railway-Train Telegraph. Charles F. McGlashan, Santa Barbara, Cal. Filed Feb. 21, 1882. (No Model.)

261,435. Secondary Battery. Charles Cuttriss, Leeds, County of York, England. Filed May 1, 1882. (No Model.)

261,5—. Smoothing and Polishing the Surface of Carbon Electrodes. Charles W. Brown, Wakefield, assignor to the American Bell Telephone Company, Boston, Mass. Filed Nov. 17, 1881. (No Specimens.)

261,512. Secondary Battery. Charles F. Brush, Cleveland, Ohio. Filed June 9, 1881. (No Model.)

261,186. Telephone Switch Apparatus. Theodore N. Vail, Boston, Mass. Filed Dec. 10, 1881. (No Model.)

261,265. Thermostatic Cut-out for Electric Lighting Systems. Henry A. Seymour, Washington, D.C., assignor to George W. Stockly, Cleveland, Ohio. Filed Jan. 26, 1882. (No Model.)

A printed copy of the specification and drawing of any patent published herein, also of any patent issued since 1865, will be furnished by any of the patent solicitors whose advertisements appear in this journal. In ordering, please state the number and date of the patent desired.

The Metallic Age.

The observing eye throughout the world will find
That all the metals typify mankind;
That youth and age, the base and nobler part,
Find each a symbol in metallic art.

The girl with golden hair—the Golden Age—
Have furnished themes for many a poet's page,
And sterling honesty is tersely told
In that trite phrase, "He is as good as gold."

The old man in his easy chair
We say is honored for his silvery hair;
And when with woe we find ourselves repining
We say, "This cloud must have a silver lining."

When some great deeds the noblest minds reveal
We say, "These men are blessed with nerves of steel."
And when some shameless scoundrel we may pass,
We say, "That fellow has a front of brass."

The plastic mind of childhood, it is said,
Moulds easily like pewter or like lead;
While of the men whom sterner thoughts environ
We say, "They show they have a will of iron."

—W. L. ORMSBY, JR.

Edison Light Fixtures for Houses.

Messrs. Bergmann & Company have just issued a new and enlarged edition of their catalogue of electric light fixtures for houses, including electroliers, pendants, hall lights, newels, a great variety of brackets including stationary, desk and swinging brackets, hand lamps, portable lamps and a large variety of other appliances. There are also designs of combination light brackets for both electric light and gas, a feature to which the firm have given a good deal of attention. We notice that they have dropped the use of the word chandelier, and in its place have adopted the word electrolier, which is already in general use in England to indicate an electric light chandelier. Copies of the catalogue of Messrs. Bergmann & Company can be obtained at their factory. No. 108 Wooster street, New York City.

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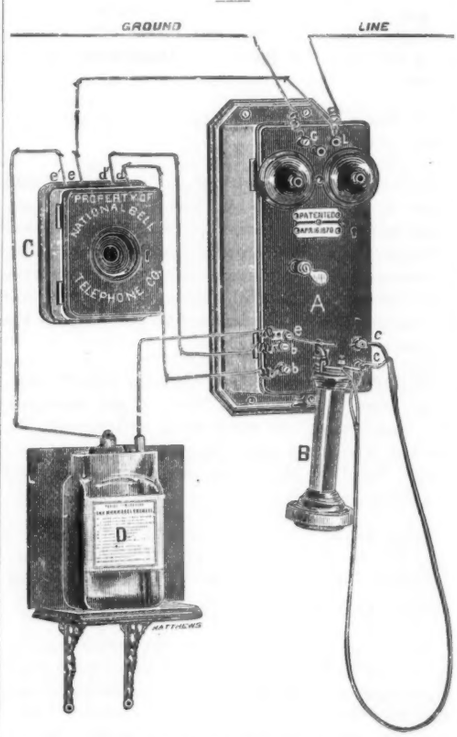

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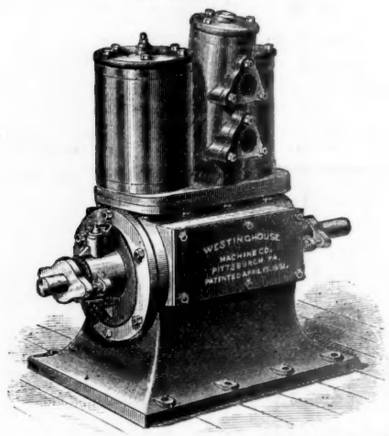

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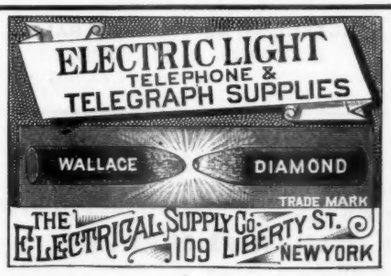

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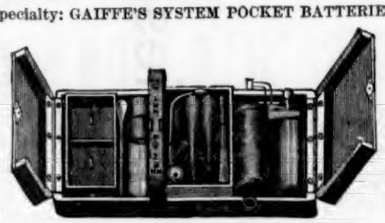

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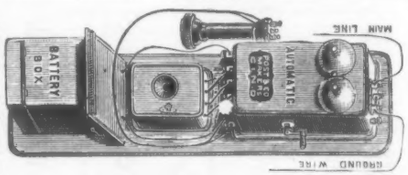

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